Ruggcore™ REC3425

User Manual

Ruggdized Embedded Controller

Intel® Core™ 2Duo/Core™ Duo/Celeron™ M Processor

(1st Edition 10/05/2009)

All information is subject to change without notice.

Approved by	Checked by	Prepared by
Ming	Hank	Jack

RECORD OF REVISION

Version and Date	Page	Old Description	New Description	Remark
Oct.05 2009	all		Preliminary Release	

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Packing List

Before installation, please ensure the following items have been shipped:

- ☐ 1 x REC3425 Embedded Controller
- ☐ 1 x CD-ROM for manual (in PDF format) and drivers

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Ordering Information

Model Number Description

REC3425-A01
Intel Celeron® M 1.86GHz (440) CPU, Fanless, DC 12V input, SODIMM DDRII 1GB RAM, 1 x Giga LAN, 2 x COM, 1 x VGA, 4 x USB, CompactFlash™ Slot, Mini-PCI, HDD Bay

REC3425-A02
Intel Core™ 2Duo 1.5GHz (L7400) CPU, Fanless, +9 ~ +36V DC input, SODIMM DDRII 1GB RAM, 1 x Giga LAN, 2 x COM, 1 x VGA, 4 x USB, CompactFlash™ Slot, Mini-PCI, HDD Bay

Optional Accessories

810218001020 DVI-I to DVI-D & DVI-I to VGA Port Y Cable
810618301015 Power Cable USA Type
810618301070 Power Cable Europe Type

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
11. Never pour any liquid into an opening. This could cause fire or electrical shock.
12. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
13. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
14. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 70°C (158°F). IT MAY DAMAGE THE EQUIPMENT.

FCC Safety

This device complies with Part 15 FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received including interference that may cause undesired operation.

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1.0 INTRODUCTION

1.1 About Ruggcore™ Embedded Controller

Due to the growing popularity from the IPC market, the newest Ruggcore™ series REC3425 Embedded Controller has been launched. Compared with the REC3423, it is an advanced version because it utilizes an Intel® Core 2 Duo processor without a fan.

The REC3425 Embedded Controller system's design concept not only focuses on the fast expanding Machine Automation market but also the Industrial Automation industry. The REC3425 provide one mini PCI slot (internal) for expansion.

In this era of information explosion, the advertising of consumer products will not be confined to the family television, but will also spread to high-traffic public areas, like retailer, the bus, transportation station, the supermarket etc. The advertising marketing industry will resort to every conceivable means to transmit product information to consumers. System integrators will need a multifunction device to satisfy commercial needs for such public advertising.

Being a control center, the REC3425 is suitable for public multimedia entertainment services. Equipped with a high efficiency heat conduction mechanism, the REC3425 is compact in size but has attractive and flexible extension capabilities.

A solid sealed aluminum case provides vibration and dust resistance while also providing a passive cooling solution. The REC3425 provides system integrators with a turn-key solution and versatile application development path to fulfill the diversified market demand.

The REC3425 can be used as a standalone system, and wall-mounted. The system accepts a wide range of power supplies (DC power in). The rugged aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but also passive cooling for quiet fanless operation.

The REC3425 Embedded Computer supports Compact Flash card and SATA II HDD for storage options and it can provide the diversified application field. Therefore REC3425's expandable function, compact size combined with fanless design and highly efficient heat conduction mechanism can fulfill any rugged technical application in industrial automation, factory control, and test instrumentation.

1.2 FEATURES

- Intel® Core™ 2 Duo/ Core™ Duo/ Celeron® M (65nm) Processors
- Rugged & Fanless Design
- Wide operation temperature
- Wide Range DC Input (+9V ~ 36V or 12V DC)

1.3 SPECIFICATIONS:

System

Processor	Intel® Core 2 Duo/ Core Duo/ Core Solo/ Celeron® M (Yonah) Processors, FSB 533/667MHz
Chip Set	Intel® 945GM + ICH7M
System Memory	*DDRII SODIMM x 1, Max. 2GB (DDRII 400/533/667 MHz)*

Ethernet	Intel® 82573L, 10/100/1000Base-TX,RJ-45 x 1
Storage	*CF Card* *SATAII HDD Bay*
Audio	*Line-Out, MIC in*
I/O Interface-Front	PWR/HDD LED, Power on SW, PS/2 Keyboard & Mouse RJ45 x1, USB x2, COMx1, VGAx1
I/O Interface-Rear	Audio Phone Jack (Line-out, MIC-in), USBx2, COMx1 (RS232/422/485 x1), DC Input Phoenix Connector
BIOS	Award Plug & Play BIOS - 1MB ROM
Watchdog Timer	*Generates a time-out system reset*
Expansion Interface	*Mini PCI (internal)*
Wake On LAN	*YES*
Power Requirement	*+12V DC or +9 V DC ~ +36V DC wide range DC input*

Mechanical

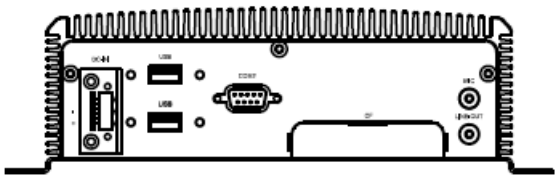
Construction	*Rugged Aluminum Alloy chassis*
Mounting	*Wallmount, Desktop*
Dimension	*196mm (W) x 69mm(H) x 150mm(D)*
Net Weight	*2.3Kg*

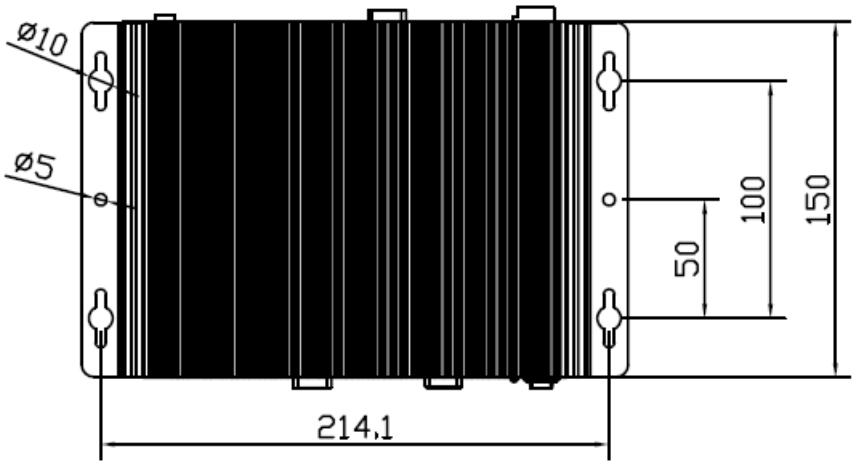
Environment

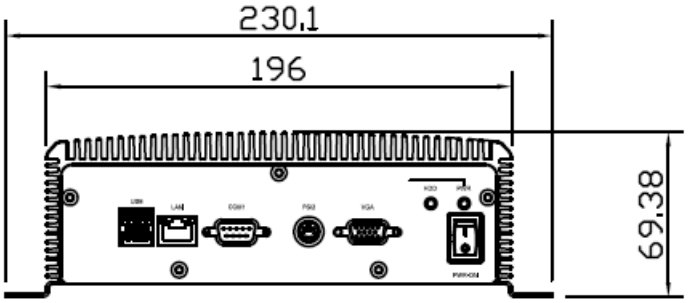
Operating Temperature	*-15°C ~ 50°C (5°F ~ 131°F) – HDD*
Storage Temperature	*-20°C ~ 70°C (-4°F ~-158°F)*
Operating Humidity	*5~90% @ 40°C, non-condensing*
Vibration:	*5g rms / 5~500Hz / random operation (CFD);* *1g rms / 5~500Hz / random operation (HDD);*
Shock:	*50g peak acceleration (11msec. duration)(CFD)* *20g peak acceleration (11msec. duration) (HDD)*
Certification	*CE/FCC*

2.0 HARDWARE INSTALLATION

2.1 REC3425 Dimension

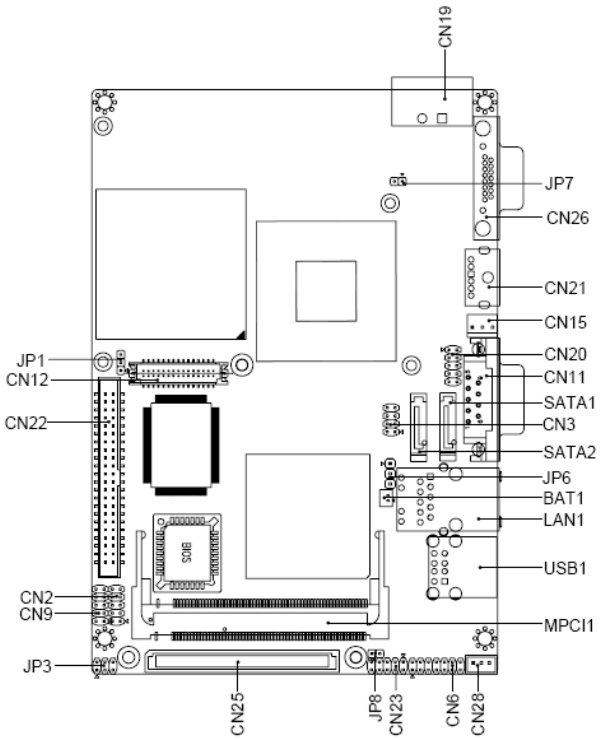




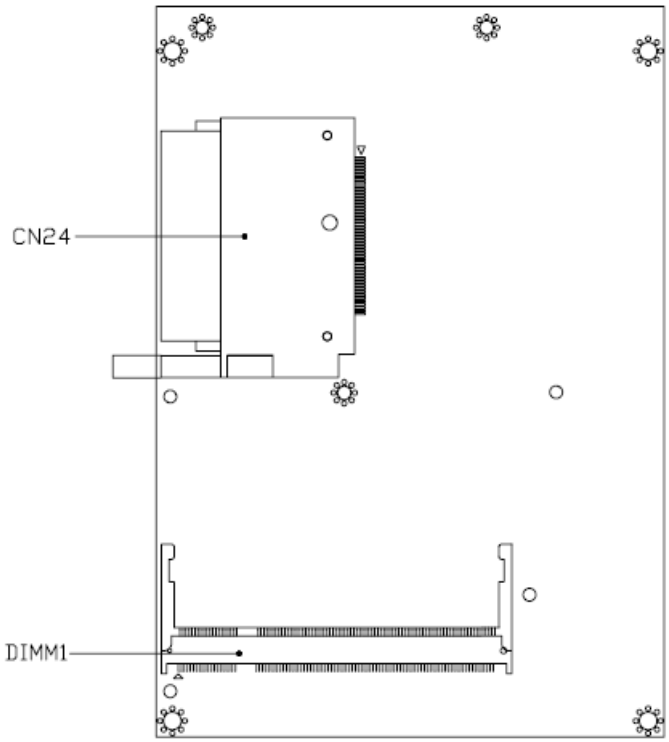


2.2 Location of Connectors and Jumpers

Component Side



Solder Side



2.2.1 List of Connectors

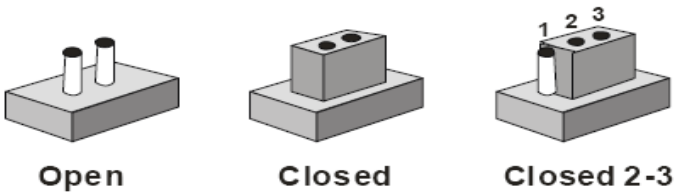
The board has a number of connectors that allow you to configure your system to suit your application.
The table below shows the function of the board's connectors:

Connectors

Label	Function
CN2	Digital I/O Connector
CN3	TV-Out Connector
CN6	Audio Connector
CN9	COM2 RS-232/422/485 Serial Port Connector
CN11	COM1 RS-232 Serial Port Connector
CN12	LVDS (1)-LCD Connector
CN15	Fan Connector
CN19	DC12V Power Connector
CN20	USB Connector
CN21	PS2 Keyboard/Mouse Connector
CN22	EIDE Connector
CN23	Front Panel Connector
CN24	Compact Flash Slot
CN25	Expansion board 140Pins slot
CN26	VGA Display Connector
CN28	SPDIF IN/OUT Connector
LAN1	10 /100 /1000 Base-TX Ethernet Connector
USB1	USB Connector
BAT1	RTC BATTERY Connector
MPCI1	Mini PCI Slot
SATA1	Primary Serial ATA Connector
SATA2	Secondary Serial ATA Connector
DIMM1	DDR2 SODIMM Slot

2.2.2 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.
To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change. Generally, you simply need a standard cable to make most connections.

2.2.3 List of Jumpers

Jumpers

Label	Function
JP1	LVDS(1)-LCD(CN12) Voltage Selection
JP3	COM2 Ring/+5V/+12V Selection
JP6	Clear CMOS
JP7	ATX Power Simulate AT Power
JP8	Buzzer Header

LVDS(1)-LCD(CN12) Voltage Selection (JP1)

JP1	Function
1-2	+5V
2-3	+3.3V (Default)

COM2 Ring/+5V/+12V Selection (JP3)

JP3	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

Clear CMOS (JP6)

JP6	Function
1-2	Protected (Default)
2-3	Clear

ATX Power Simulate AT Power (JP7)

JP7	Function
NC	ATX or AT standard (Default)
1-2	ATX Power Simulate AT Power

Buzzer Header (JP8)

JP8	Function
Pin1	External Buzzer (+)
Pin2	External Buzzer (-)

AC97 Audio Connector (CN6)

Pin	Signal	Pin	Signal
1	First MIC_IN	2	Secondary MIC_IN
3	LINE_IN_GND	4	CD_GND
5	LINE_IN_L	6	CD_IN_L
7	LINE_IN_R	8	CD_GND
9	LINE_IN_GND	10	CD_IN_R
11	LINE_OUT_L	12	LINE_OUT_R
13	LINE_OUT_GND	14	LINE_OUT_GND

COM2 RS-232/422/485Serial Port Connector (CN9)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI/VCC12/VCC5	10	N.C.

LVDS (1)-LCD Connector (CN12)

Pin	Signal	Pin	Signal
1	BKLTEN	2	BKLTCTL
3	PPVCC	4	GND
5	LVDS1_TXCLK-	6	LVDS1_TXCLK+
7	PPVCC	8	GND
9	LVDS1_TX0-	10	LVDS1_TX0+
11	LVDS1_TX1-	12	LVDS1_TX1+
13	LVDS1_TX2-	14	LVDS1_TX2+
15	NC	16	NC
17	I2C_DATA	18	I2C_CLK
19	LVDS2_TX0-	20	LVDS2_TX0+
21	LVDS2_TX1-	22	LVDS2_TX1+
23	LVDS2_TX2-	24	LVDS2_TX2+
25	NC	26	NC
27	PPVCC	28	GND
29	LVDS2_TXCLK-	30	LVDS2_TXCLK+

DC12V Power Connector (CN19)

Pin	Signal	Pin	Signal
1	+12V	2	GND

USB Connector (CN20)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD2-	4	GND
5	USBD2+	6	USBD3+
7	GND	8	USBD3-
9	GND	10	+5V

PS2 Keyboard/Mouse Connector (CN21)

Pin	Signal	Pin	Signal
1	KBDAT	2	MSDAT
3	GND	5	VCC_KB
6	KBCLK	8	MSCLK
H1	GND	H1	GND
H3	GND		

EIDE Connector (CN22)

Pin	Signal	Pin	Signal
1	IDE RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12

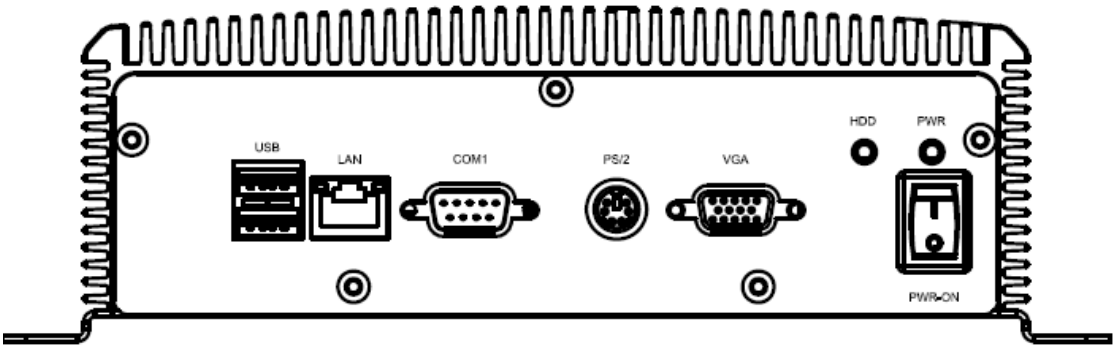
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N.C.
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ14	32	N.C.
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	HD LED	40	GND
41	+5V	42	+5V
43	GND	44	N.C.

Front Panel Connector (CN23)

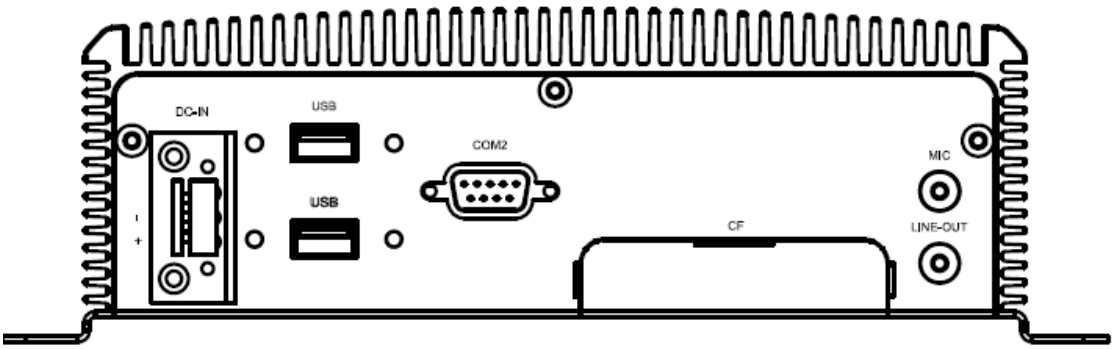
Pin	Signal	Pin	Signal
1	Power On Button (-)	2	Power On Button (+)
3	IDE LED (-)	4	IDE LED (+)
5	External Buzzer (-)	6	External Buzzer (+)
7	Power LED (-)	8	Power LED (+)
9	Reset Switch (-)	10	Reset Switch (+)

2.3 External I/O Connectors

Front View



Rear View



3.0 AWARD BIOS SETUP

3.1 Award BIOS Setup

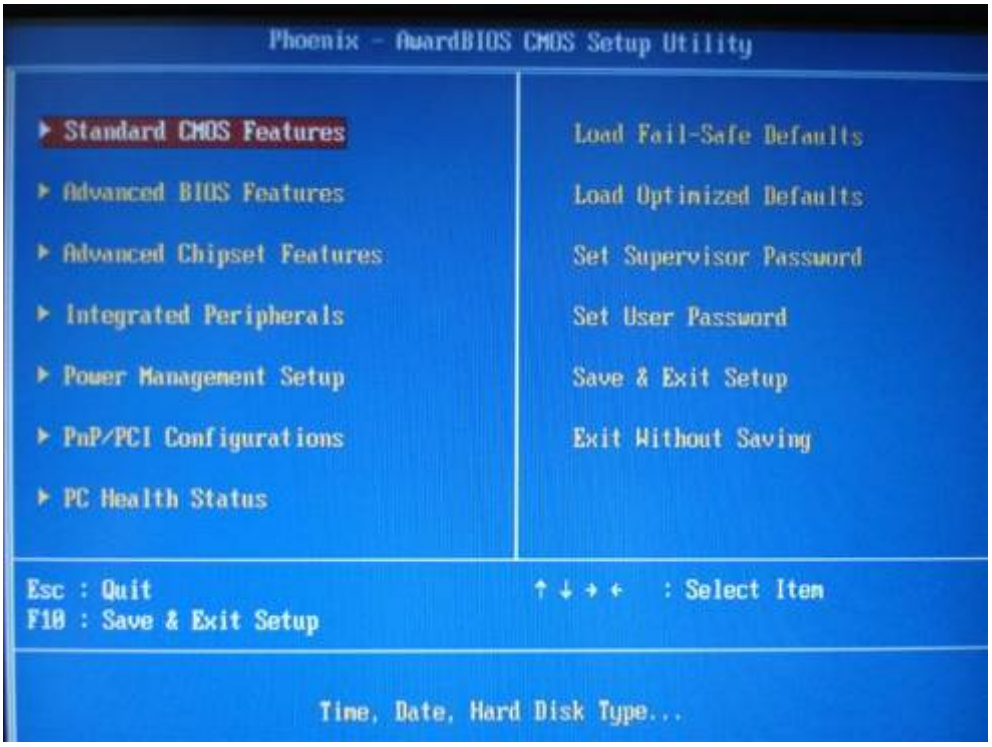
The BIOS setup, also called CMOS setup, is a crucial part of the proper setting up of Ruggcore. The BIOS (Basic Input Output System) tells the operating system the characteristics of the main basic components of Ruggcore. Because of this, an incorrectly set up BIOS can result in some devices not being recognized by the operating system.

Getting into the Award BIOS

Cold boot Ruggcore and when you see the first screen showing in monitor, press the Delete key repeatedly till you get a blue screen titled.
When you successfully get into the BIOS setup, you will be presented with the following menu.

Setup 1: The Main BIOS Menu.

The sections that follow provide guidelines on how to set up the various settings in each section of the BIOS. We have concentrated only on those settings that may need changing, if a setting does not appear in this document, leave it as you found it.
Press Enter on a main menu option to go into that section.
To return to the Main Menu from within a section, press Escape.



Screen 1

Setup 2: Standard CMOS Features

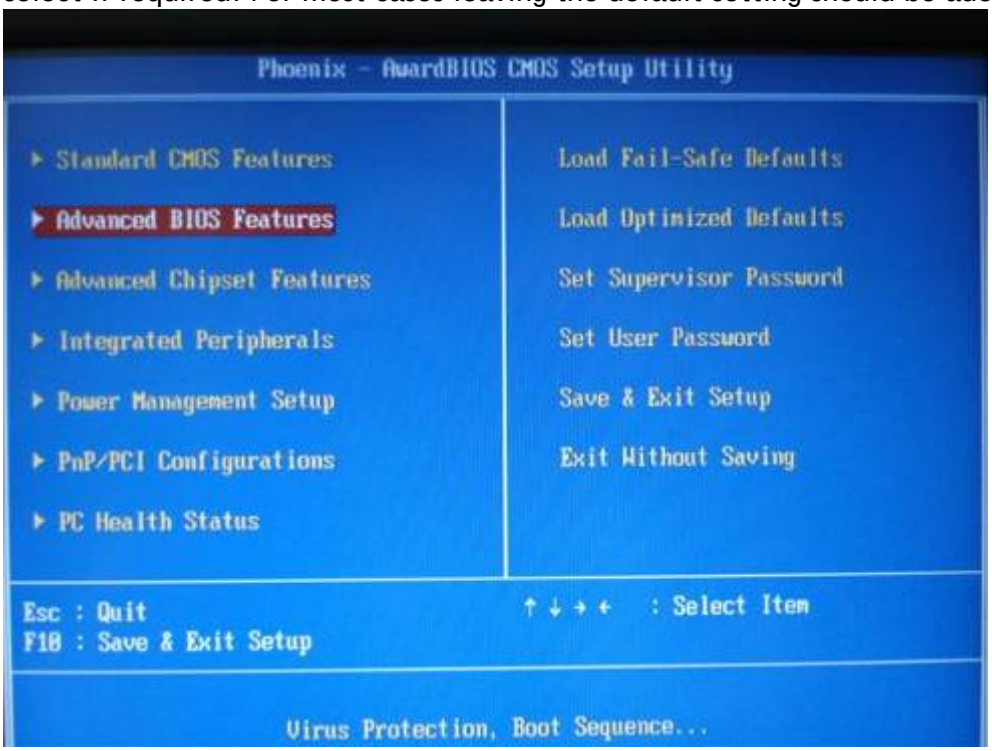
Here you can setup the basic BIOS features such as date and time. Use the arrow keys to move around and press enter to select the required option. You can specify what IDE or SATA devices you have such as Hard drive, CF device etc. The easiest way to setup the devices is by leaving it set to auto. This allows the BIOS to detect the devices automatically so you don't have to do it manually. At the bottom, it also displays the total memory in your system. Verify that your hard disk or CF device have been correctly detected in the shaded fields.

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Mon, Jan 19 2009
Time (hh:mm:ss) 18 : 10 : 48
IDE Channel 0 Master [TRANSCEND]
IDE Channel 0 Slave [None]
SATA Port1 Device [None]
SATA Port2 Device [None]
Video [EGA/VGA]
Halt On [All , But Keyboard]
Base Memory 639K
Extended Memory 1038336K
Total Memory 1039360K
Item Help
Menu Level ▸
Change the day, month, year and century

Screen 2

Setup 3: Advanced BIOS Features

As you can see from screen 3, there are numerous advance settings which you can select if required. For most cases leaving the default setting should be adequate.



Screen 3

As you can see from the screen 4, the first and second boot device is set to Hard Disk. This ensures that the hard disk is read first when the system boots, and therefore can boot from boot disk. The third is set to CD ROM.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
Hard Disk Boot Priority [Press Enter]
CPU L3 Cache [Enabled]
Quick Power On Self Test [Enabled]
First Boot Device [Hard Disk]
Second Boot Device [USB-CDROM]
Third Boot Device [CDROM]
Boot Other Device [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Typematic Rate Setting [Disabled]
x Typematic Rate (Chars/Sec) 6
x Typematic Delay (Msec) 250
Security Option [Setup]
APIC Mode Enabled
MPS Version Control For OS [1.4]
OS Select For DRAM > 64MB [Non-OS2]
Full Screen LOGO Show [Enabled]
Small Logo(EPA) Show [Enabled]
Item Help
Menu Level ▸
Select Hard Disk Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help

Screen 4

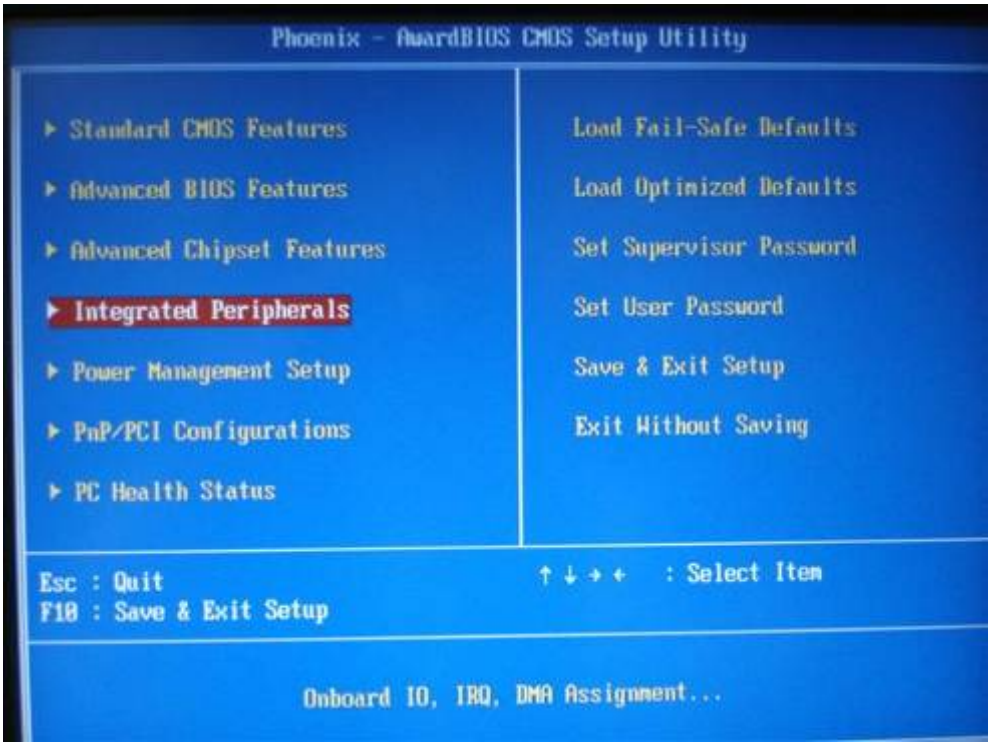
Setup 4: Advanced Chipset Features

Here you can setup the contents of the chipset buffers. It is closely related to the hardware and is therefore recommended that you leave the default setting unless you know what you are doing. Having an incorrect setting can make your system unstable.

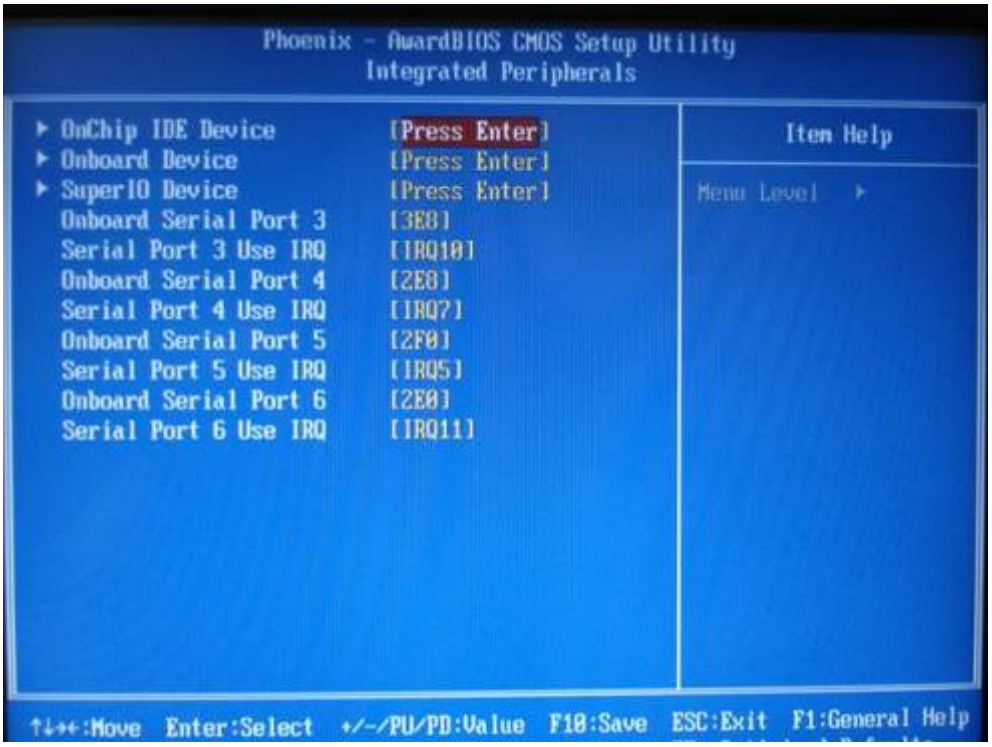
Screen 5

Setup 5: Integrated Peripherals

This menu allows you to change the various I/O devices such as IDE controllers, serial ports, keyboard, USB, and LAN. You can make changes as necessary.



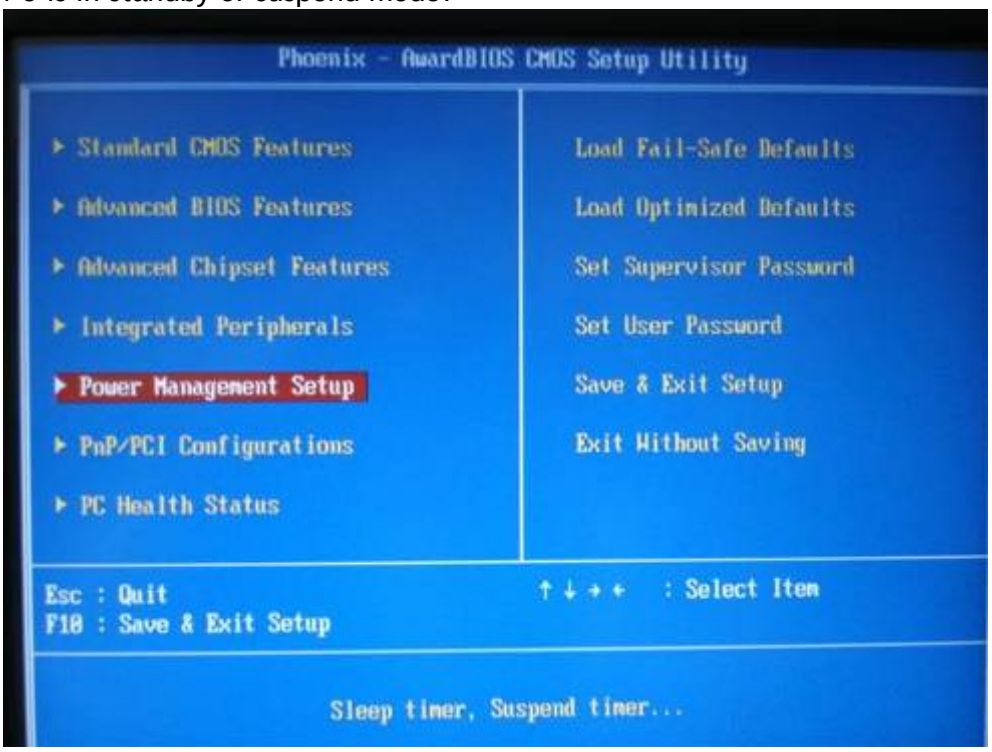
Screen 6


Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
Onboard Device [Press Enter]
SuperIO Device [Press Enter]
Onboard Serial Port 3 [3E8]
Serial Port 3 Use IRQ [IRQ10]
Onboard Serial Port 4 [2E8]
Serial Port 4 Use IRQ [IRQ7]
Onboard Serial Port 5 [2F8]
Serial Port 5 Use IRQ [IRQ5]
Onboard Serial Port 6 [2E8]
Serial Port 6 Use IRQ [IRQ11]
Item Help
Menu Level ▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help

Screen 7

Setup 6: Power Management Setup

The power management allows you to setup various power saving features, when the PC is in standby or suspend mode.



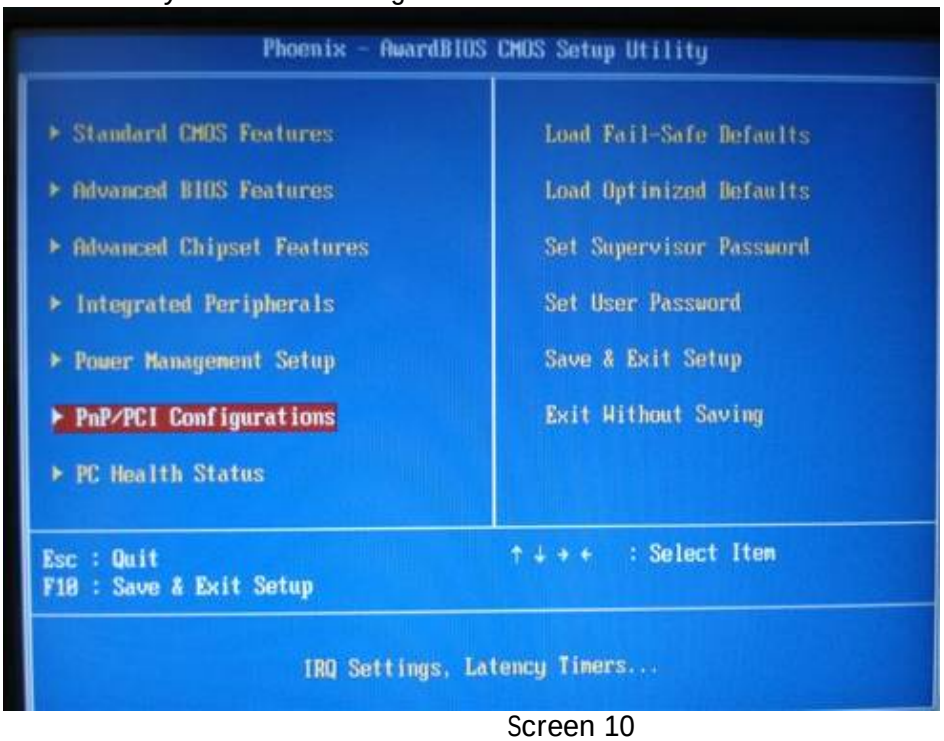
Screen 8

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
PCI Express PM Function [Press Enter]
Power-Supply Type [ATX]
ACPI Function [Enabled]
ACPI Suspend Type [S3(STR)]
Run VGABIOS if S3 Resume [Auto]
Power Management [User Define]
Video Off Method [DPMS]
Video Off In Suspend [Yes]
MODEM Use IRQ [3]
Suspend Mode [Disabled]
HDD Power Down [Disabled]
Soft-Off by PWR-BTTN [Delay 4 Sec.]
Wake-Up by PCI card [Enabled]
Power On by Ring [Enabled]
Resume by Alarm [Disabled]
x Date(of Month) Alarm 0
x Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help

Screen 9

Setup 7: PnP/PCI Configurations

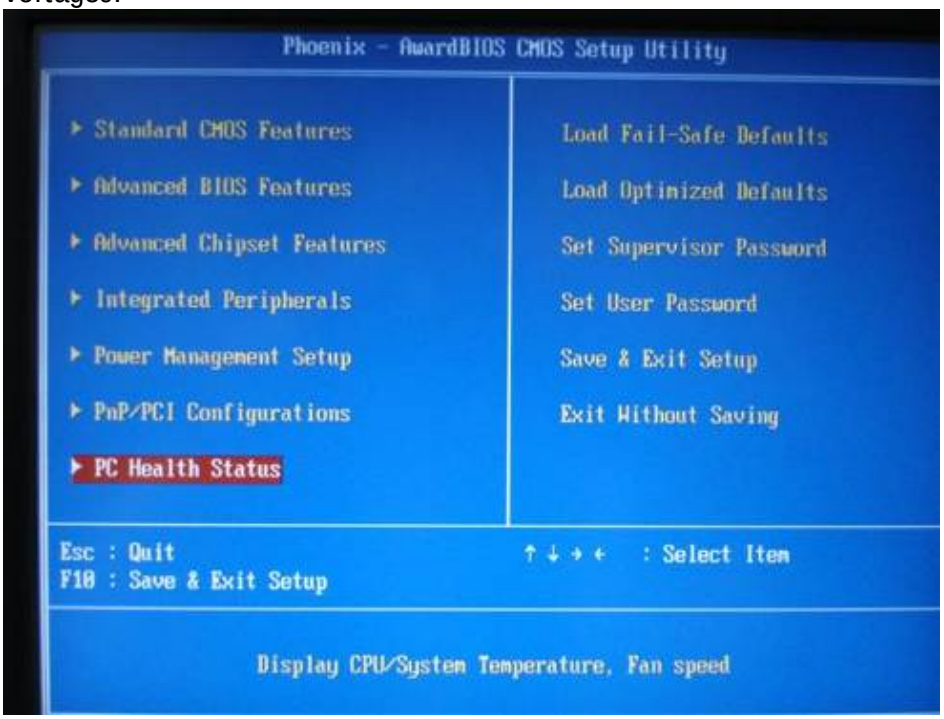
This menu allows you to configure your PCI slots. You can assign IRQ's for various PCI slots. It is recommended that you leave the default settings, BIOS can automatically configure all the boot and plug & play compatible devices. You may choose manual mode when you want to change PCI device resources.



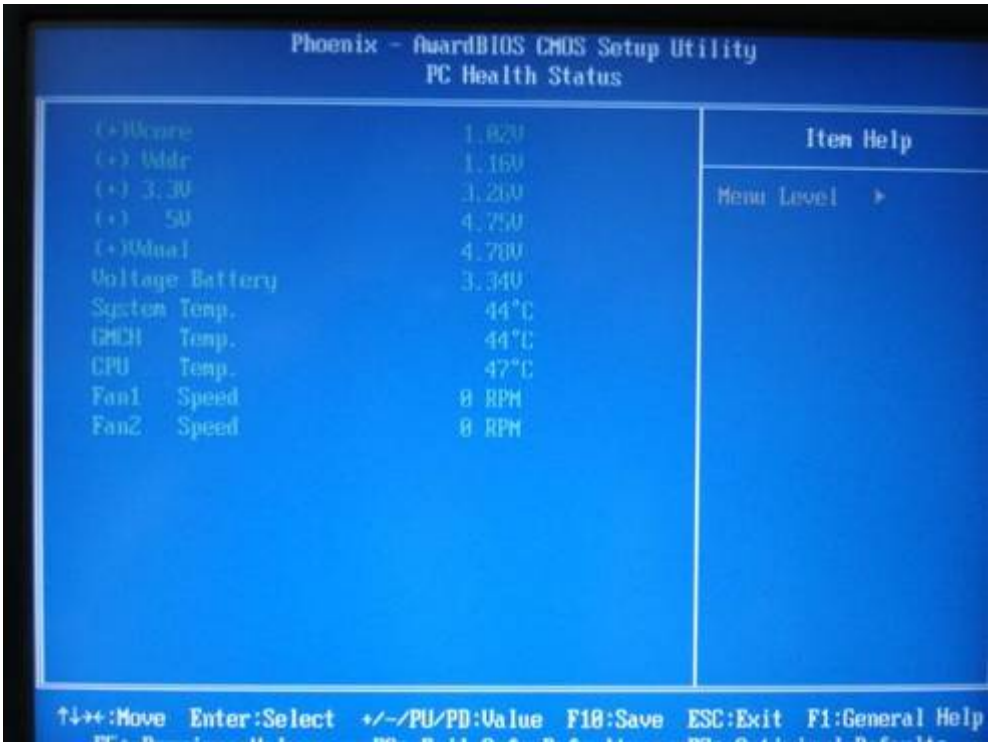
Screen 10

Setup 8: PC Health Status

This menu displays the current CPU, chipset, system temperature, fan speeds, and voltages.



Screen 11



Screen 12

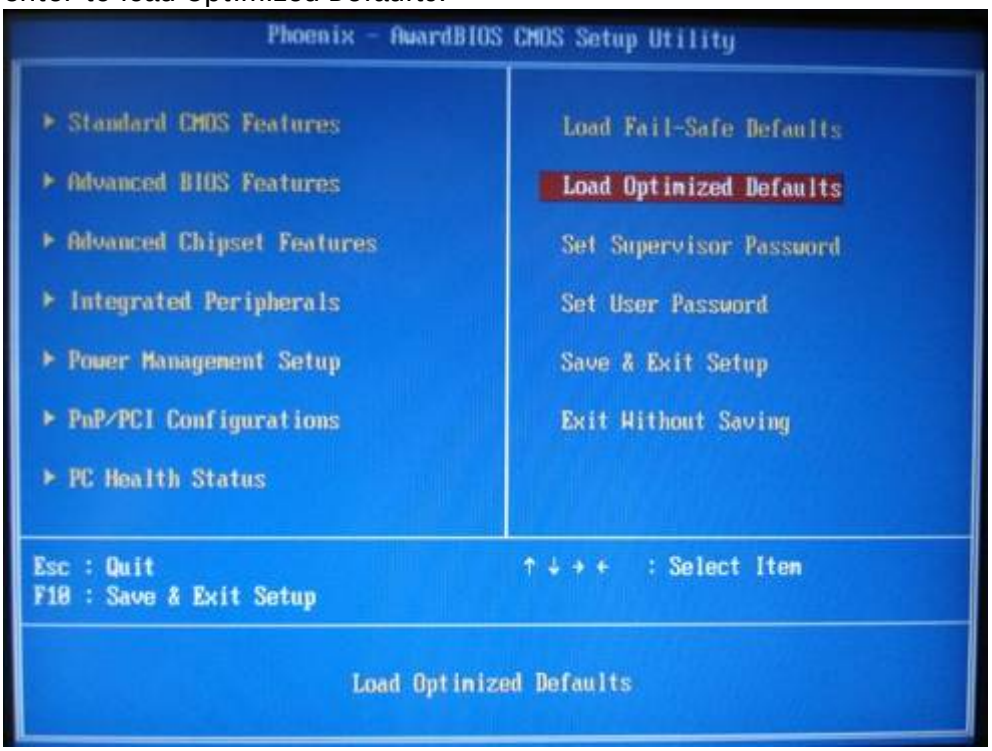
Setup 9: Load Fail-Safe Defaults

If you made changes to the BIOS and your system becomes unstable as a result, you can change it back to default. However if you made many changes and don't know which one is causing the problem, your best bet is to choose the option "Load Fail Safe Defaults" from the BIOS menu. This uses a minimal performance setting, but the system would run in a stable way. From the dialog box Choose "Y" followed by enter to load Fail-Safe Defaults.

Screen 13

Setup 10: Load Optimized Defaults

Like the Fail-Safe mode above, this option loads the BIOS default settings, but runs the system at optimal performance. From the dialog box Choose "Y" followed by enter to load Optimized Defaults.



Screen 14

Steup11: Set Password

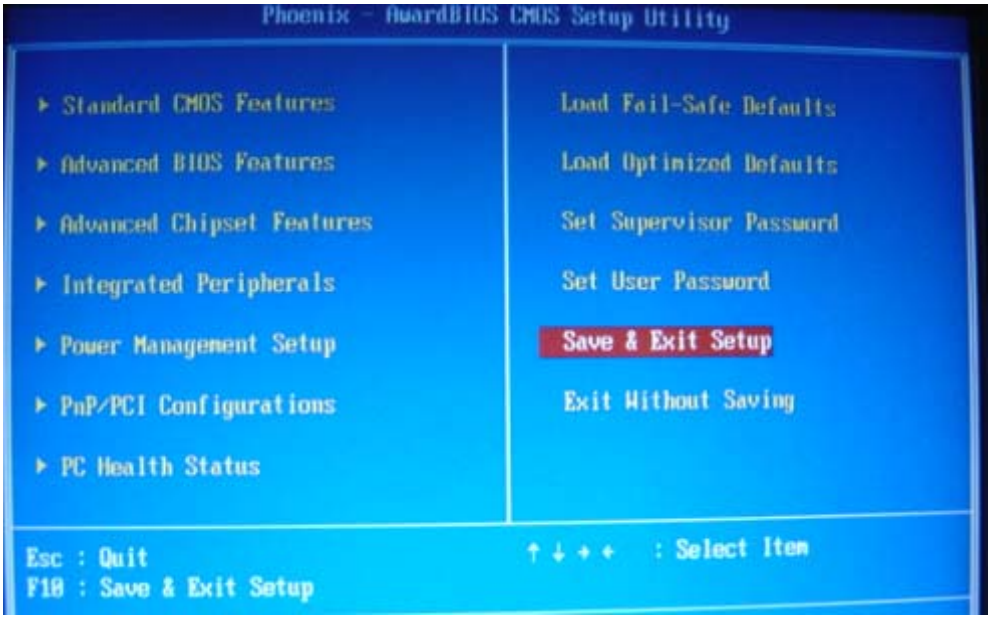
There are two kinds of password protect your BIOS, Supervisor and User password, you can specify a password and make sure you don't forget the password. You will be asked for password when you into BIOS setup manual.

Screen 15

Screen 16

Setup 12: Save and Exit Setup

To save any changes you made to the BIOS you must choose this option. From the dialog box choose "Y".



Screen 17

Setup 13: Exit without Saving

If you don't want to save changes made to the BIOS, choose "N" from the dialog box.

Screen 18

4.0 DRIVER INSTALLATION

The REC3425 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:
Step 1 – Install INF Driver
Step 2 – Install VGA Driver
Step 3 – Install LAN Driver
Step 4 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the REC3425 CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Intel INF Driver

1. Click on the *Step 1-Intel Inf Driver* folder and then double click on the *Setup.exe*
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 2 – Install Intel VGA Driver
1. Click on the *Step 2-Intel VGA Driver* folder and select the OS folder your system is
2. Double click on the ***.exe*** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 – Install Intel LAN Driver
1. Click on the *Step 3-Intel LAN Driver* folder and select the OS folder your system is
2. Double click on the *.exe* file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 – Install Realtek Audio Driver

1. Click on the *Step 4-Realtek Audio Driver* folder and select the OS folder your system is
2. Double click on the *setup.exe* located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically